2017

Time : 3 hours

Full Marks : 100

Candidates are required to give their answers in their own words as far as practicable.

The questions are of equal value.

*Answer any **five** questions.*

1. Find the rank coefficient of correlation from the following data :

Marks in Statistics	Marks in Accountancy
45	40
56	36
39	30
54	44
45	36

Marks in Statistics	Marks in Accountancy
40	32
56	45
60	42
30	20
36	36

2. The following data based on 450 students are given, for marks in Statistics at a cartain examination. Give the equations to the two lines of regression. Also estimate the average marks in Economics of the candidate who obtained 50 marks in Statistics :

	Statistics	Economics
Mean Marks($\bar{x}$)	40	48
Standard Deviation(σ)	12	16

Sum of the product of deviations of marks from their respective means :

3. The figures of output of a sugar factory are given below. Fit a straight line trend by the method of

least squares and obtain the trend values :

Year	Production(000 Qnt)
2003	77
2005	88
2006	94
2007	85
2008	91
2009	98
2012	90

4. Estimate the production for the year 2013 and 2015 with the help of the following data by binomical expansion method :

Year	Production
2010	200
2011	220
2012	260
2013	—
2014	350

Year	Production
2015	—
2016	430

5. From the following construct Fisher's Index Number:

Items	Base year 2010		Current year 2016	
	Price Per Unit (Rs.)	Total Expenditure (Rs.)	Price Per Unit (Rs.)	Total Expenditure (Rs.)
A	2	40	5	75
B	4	16	8	40
C	1	10	2	24
D	5	25	10	60

6. (a) If ${}^{n}P_{5} = 20 \times {}^{n}P_{3}$, find the value of n :

   (b) How many different words of 4 letters can be formed out of the letters of the word "PROBLEM" ? How many words with at least three letters can be formed ?

7. (a) Find n if ${}^{n}P_{r} = 24 \times {}^{n}C_{r} = 24 \times {}^{n}C_{5}$.

(b) Out of 5 ladies and 7 men a commitee of 4 is to be formed. How many ways the committee can be formed if (i) there are 3 ladies and 1 man, (ii) there are 2 ladies and 2 men (iii) there are 4 ladies ?

8. Prove that :

$$\begin{vmatrix} b+c & a-b & a \\ c+a & b-c & b \\ a+b & c-a & c \end{vmatrix} = 3abc - a^3 - b^3 - c^3.$$

9. A manufacturer sells three articles in the market of Ranchi and Patna as shown below. Find the total revenue from each city using matrix algebra :

City	A	B	C
Ranchi	10,000	15,000	30,000
Patna	9,000	15,000	20,000
Sales per unit	Rs. 3	Rs. 4	Rs. 2

10. Write short notes on any **two** of the following :

(a) Types and degrees of correlation

(b) Limitations of Index Numbers

(c) Components of time feries

(d) Difference between Correlation and Regression